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USMA Study of the Installation Management Agency CONUS Regional Structure

Presented by:
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Department of Systems Engineering
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West Point, New York

June 2005

"The views expressed in this presentation are those of the authors and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the U.S. Government."

AGENDA

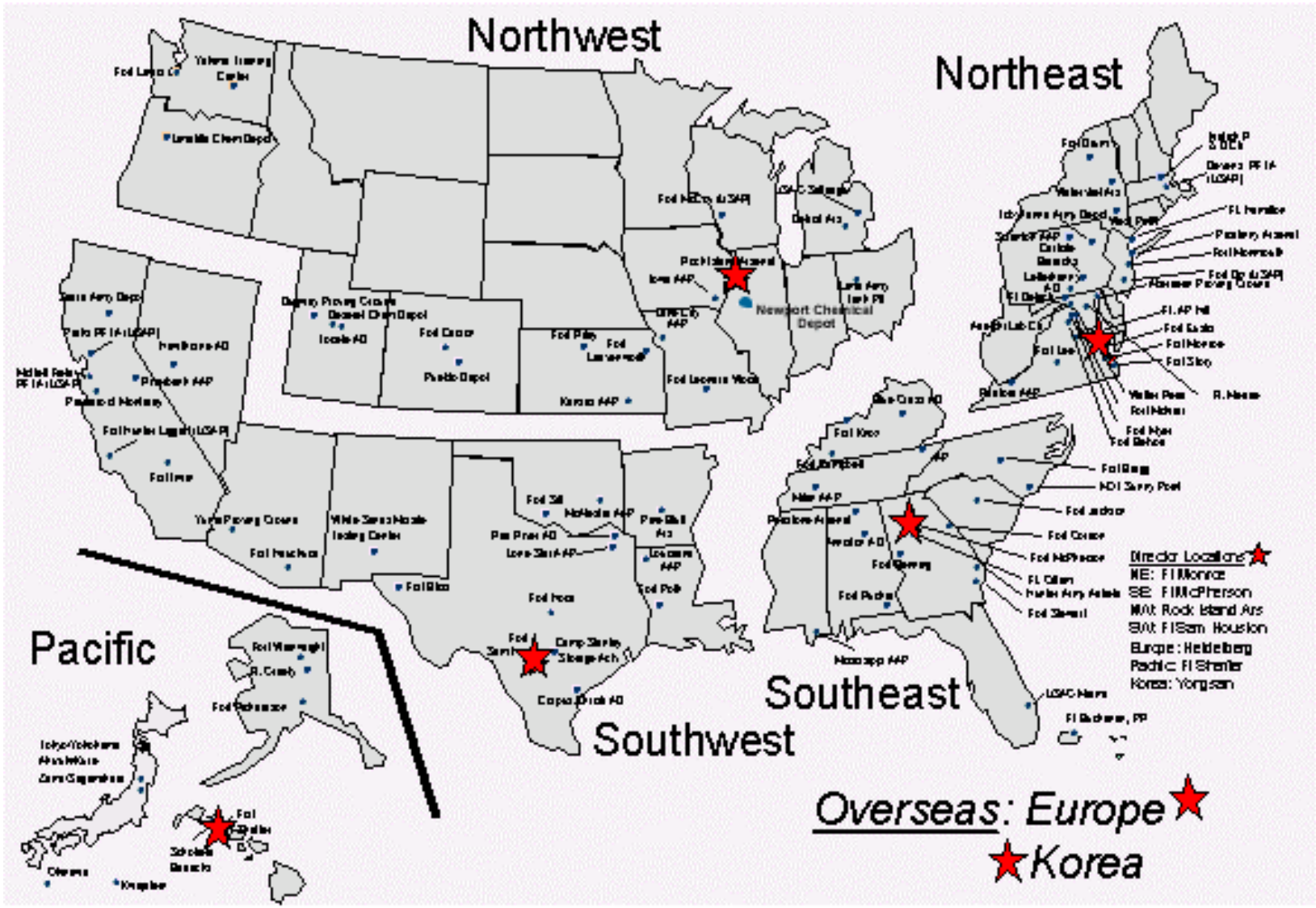
- **Background on the Problem**
- **Problem Definition**
- **The Systems Engineering and Management Process as a Problem Solving Approach**
- **Value Hierarchy of ‘Core’ Organization functions**
- **Organizational Design Alternatives**
- **Applying Multiple Objective Decision Analysis to evaluate alternative organizational designs**
- **Study Results & Recommendations**
- **Conclusions**

Problem Background

- In 2002, the US Army reorganized its process for managing installations:
  - ✓Operational Commanders no longer control day-to-day functions.
  - ✓Responsibility was vested in the new Installation Management Agency (IMA).
  - ✓Control of significant resources was shifted to the IMA.

- The IMA created quickly a geographically-based organizational structure through which to manage Army installations:
  - ✓7 Regions worldwide (4 in the continental US).
  - ✓Approximately 20 installations per Region.

Current Region Structure of the IMA in the US

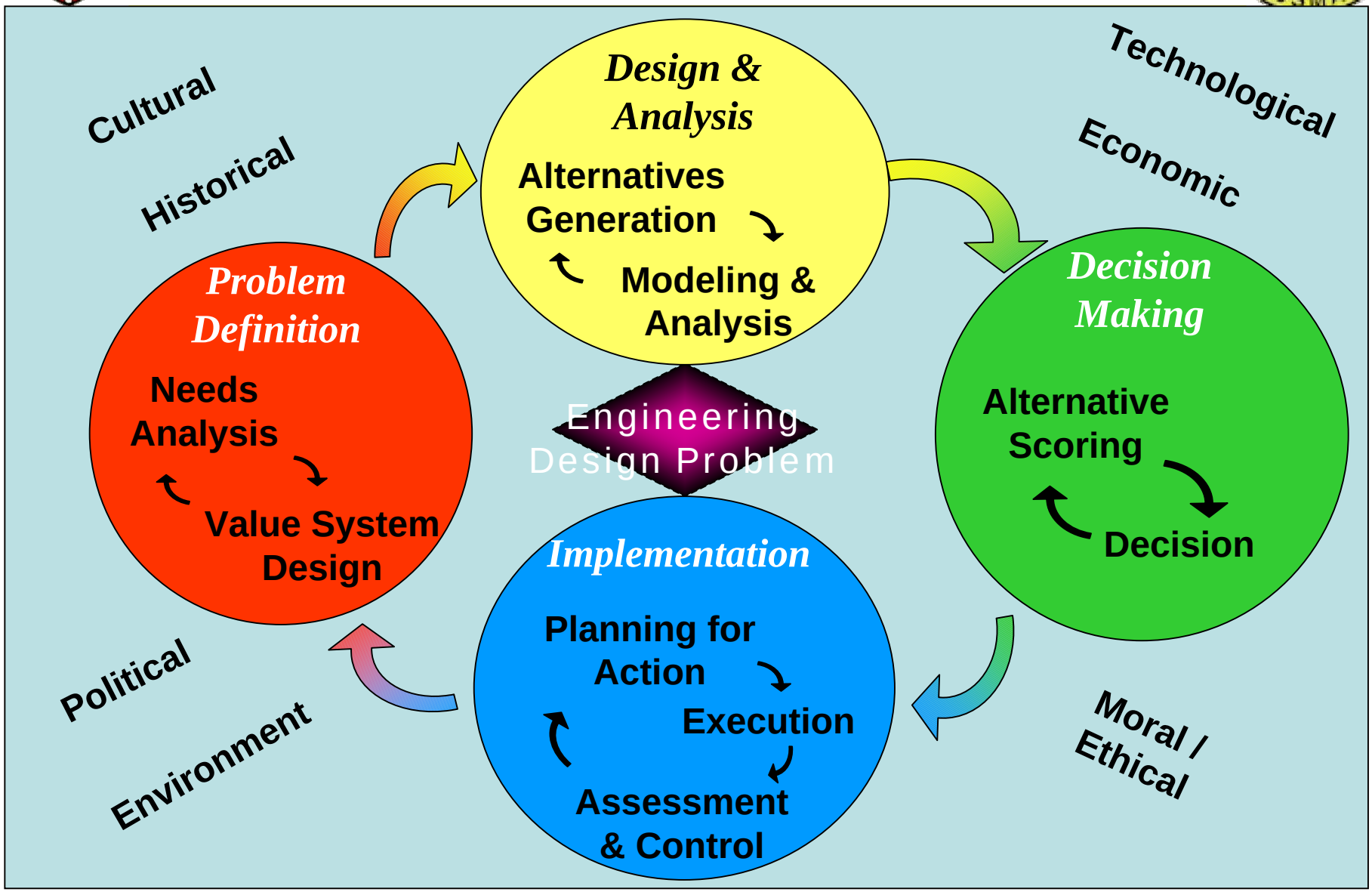


Problem Statement

- Senior Army leaders asked West Point to conduct a study to evaluate the effectiveness and efficiency of the current IMA region organizational design in the US, and provide recommendations for potential alternative structures.
- Study motivated in part by pressures to reduce personnel slots in headquarters.

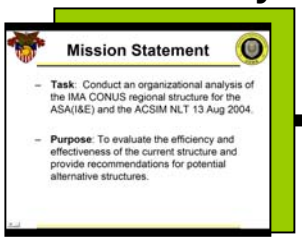
The study was initiated on 3 June 2004, and conducted over a 10-week period.

Systems Engineering and Management Process as a Problem Solving Approach

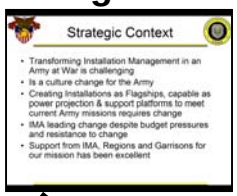


Study Methodology

Mission Analysis



Strategic Context



Research Plan

- IMA Development
- Navy
- Air Force
- Industry

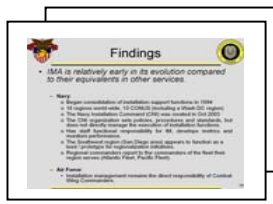
Senior Leader Interviews

- ASA(I&E)
- ACSIM
- IMA Dir
- IMA Dep Dir
- IMA RDs
- SMCs(6)
- IM HQ Staff

MACOMs	# completed	% of Total
FORSCOM	6	33%
TRADOC	3	16%
FORSCOM/ TRADOC	3	16%
AMC	3	13%
Other	2	16%
USAR	1	6%
Totals	18	

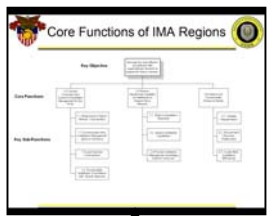
Garrisons by Region	Total in Region	# completed	% of region interviewed
Northeast	27	5	19%
Southeast	20	4	20%
Northwest	19	5	26%
Southwest	15	4	27%
Total	81	18	22%

Observations



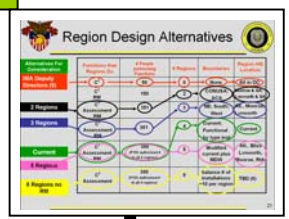
O & O Functional Analysis

Core Functions

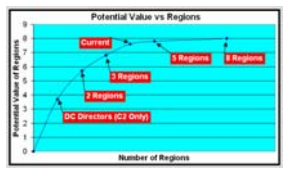


Quantitative Model

Develop Alternatives



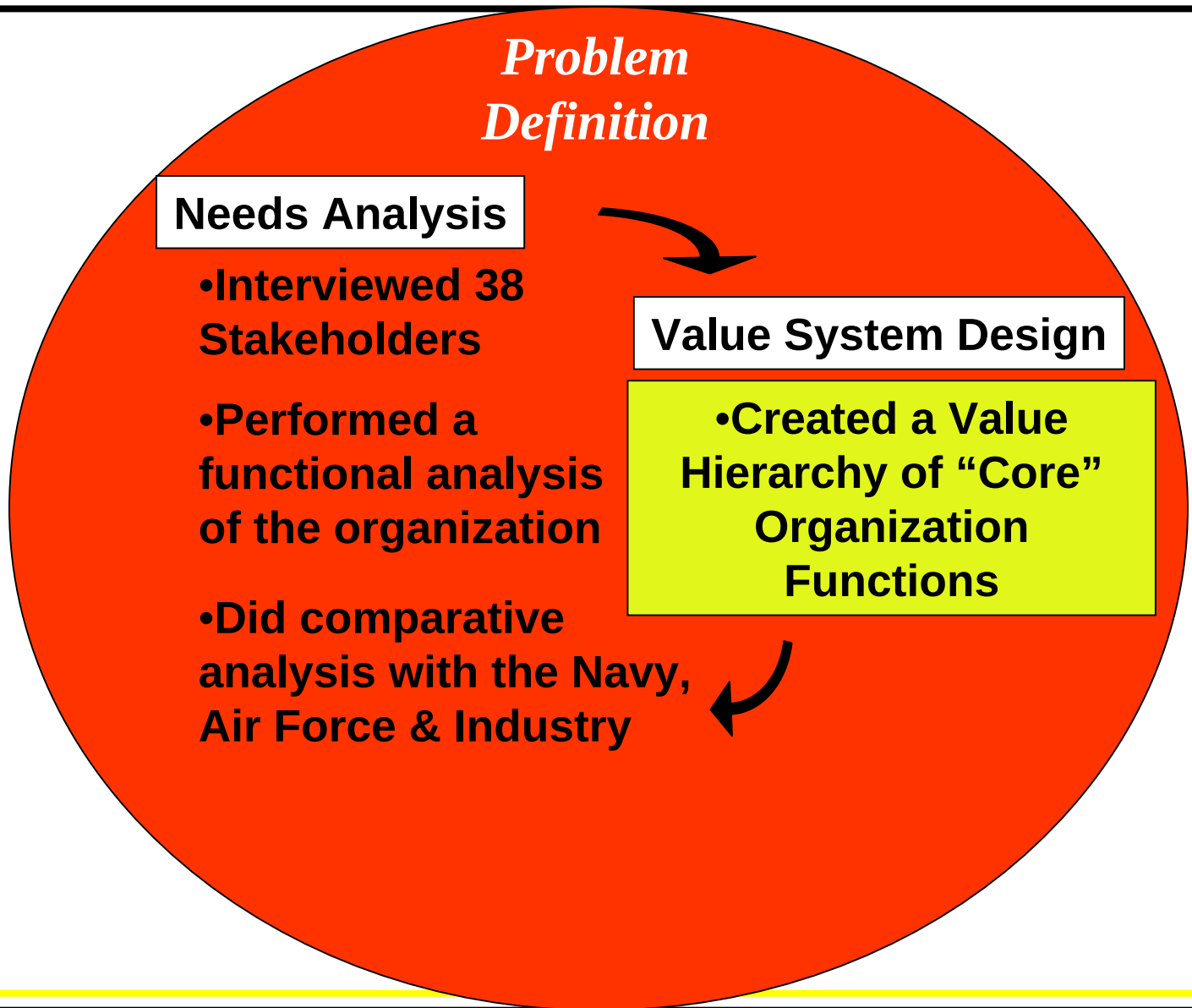
Results of Analysis



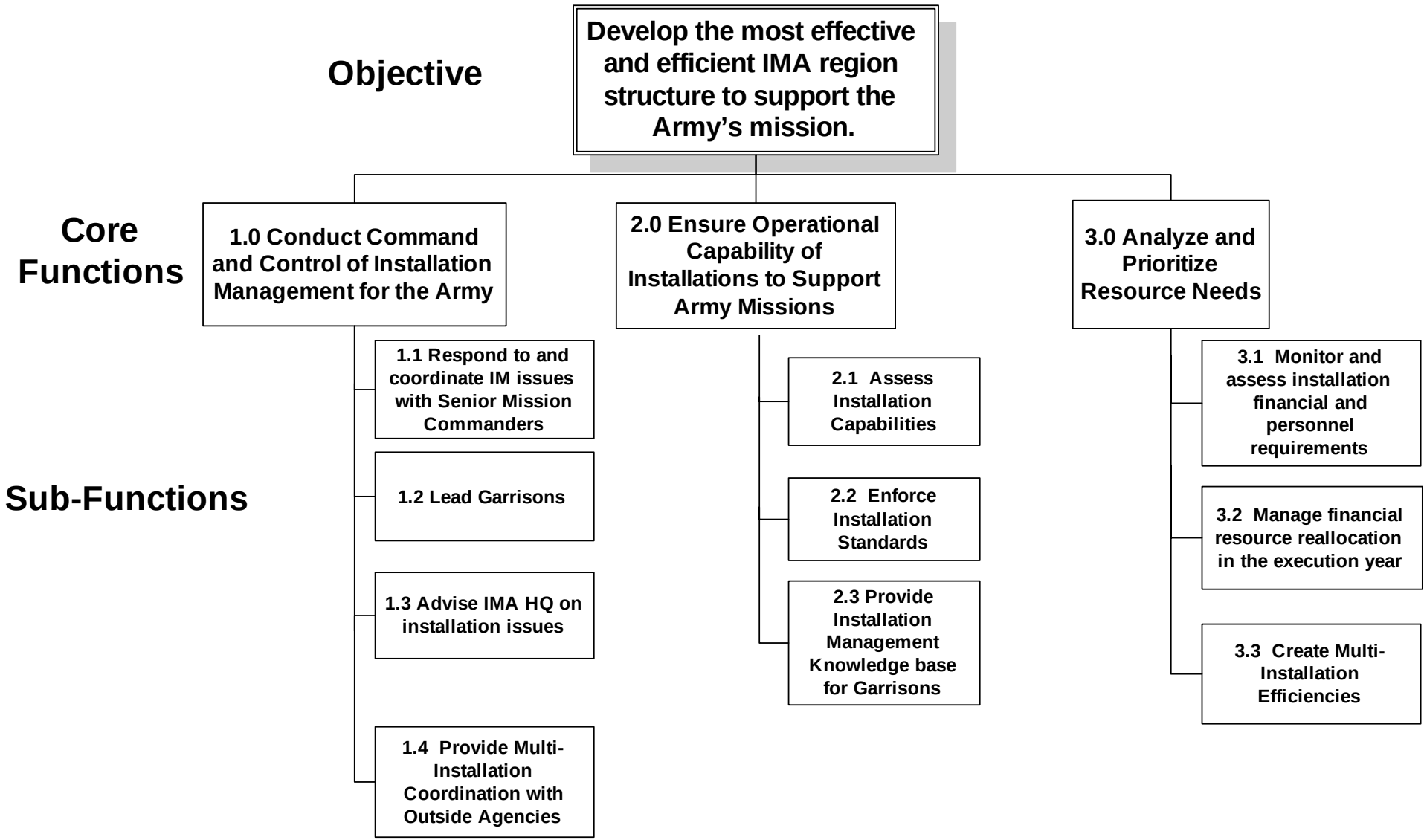
Resource Analysis

- People
- Dollars

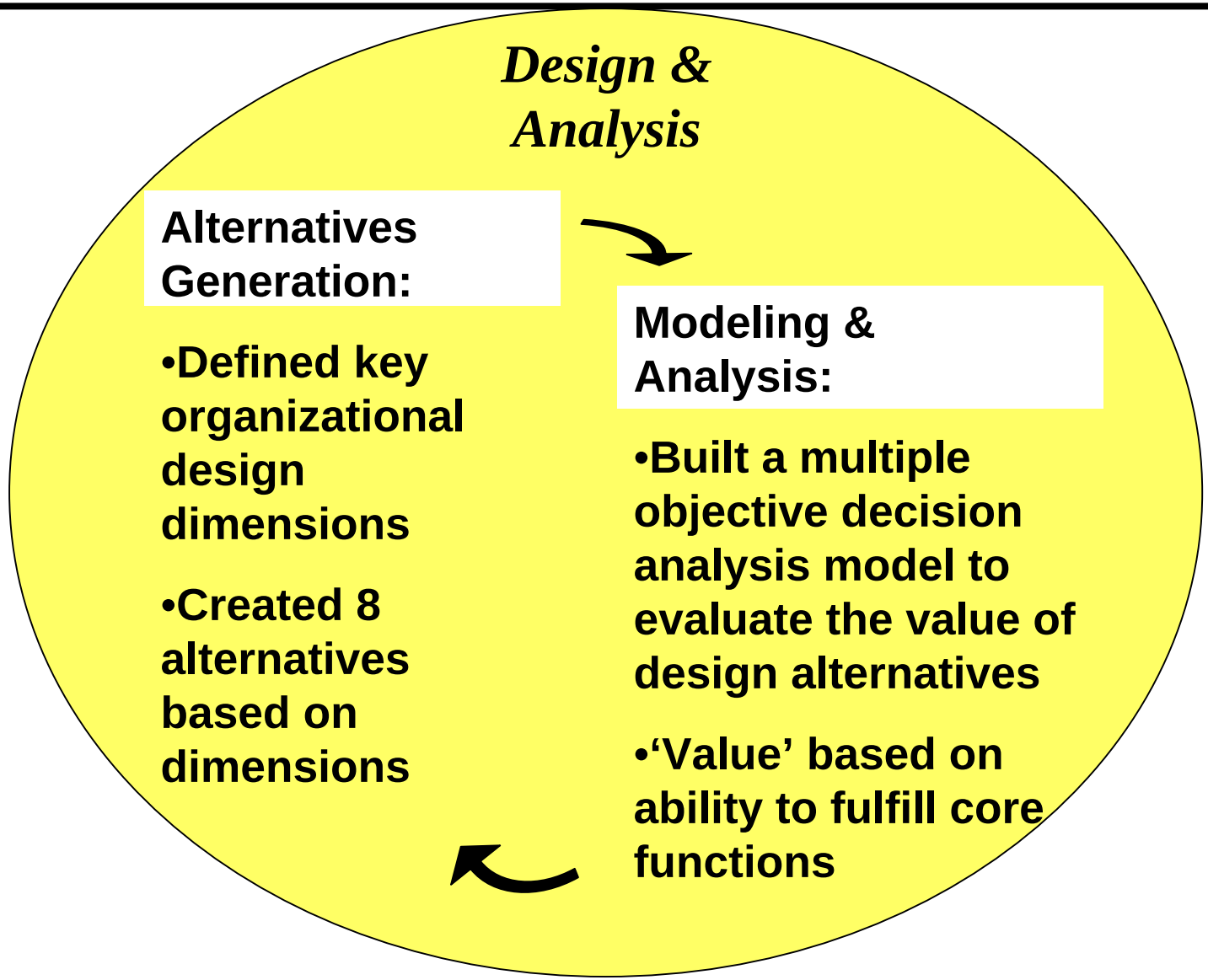
Problem Definition for the IMA Organization



Value Hierarchy of Core Functions for IMA Regions



Design & Analysis of Alternative Organizational Structures

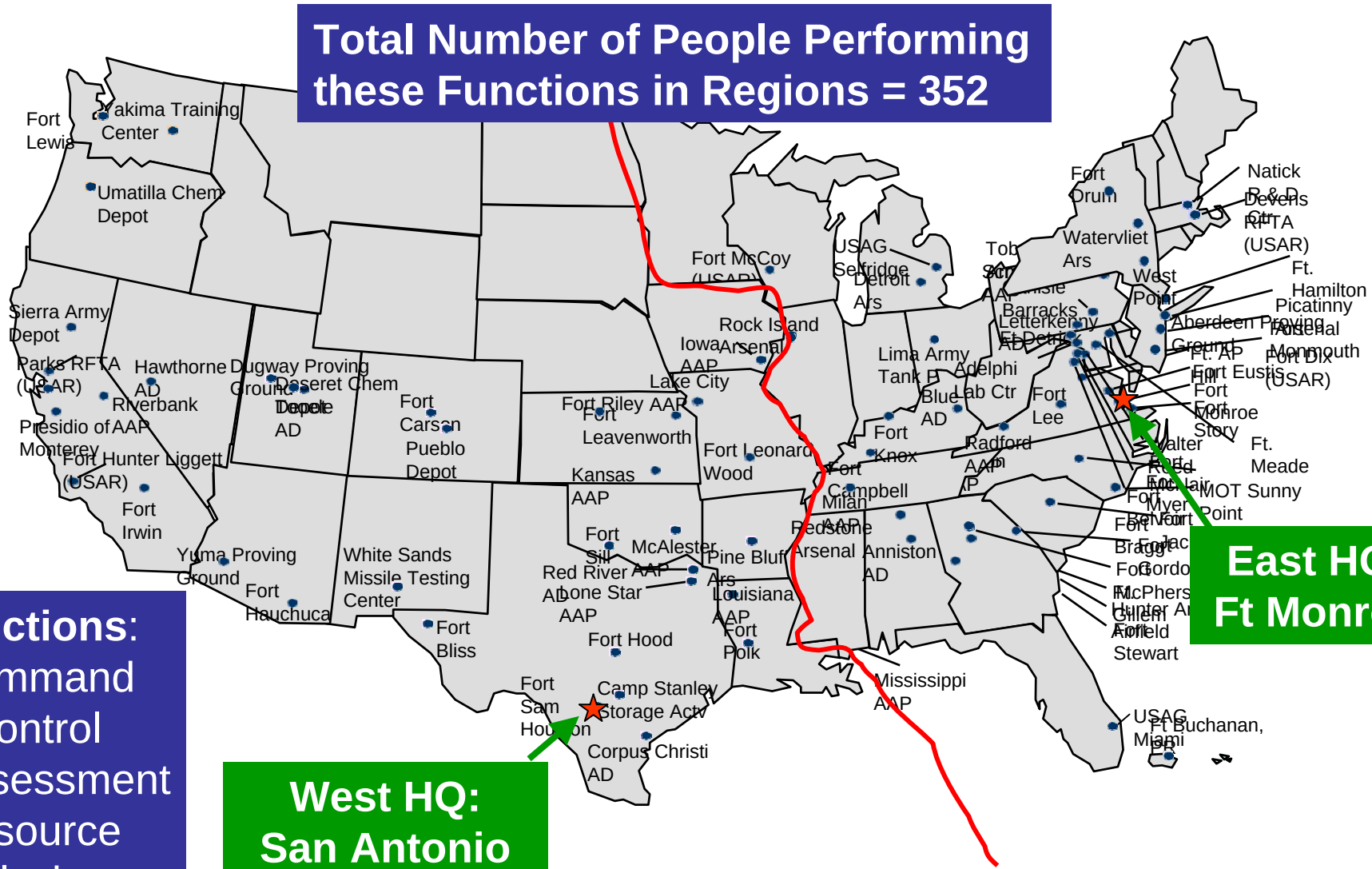


Generating Region Design Alternatives

Created Alternatives using a Range Of Design Dimensions

Key Dimensions Of Organization Design	Range of Design Dimensions
Functions that Regions Perform	Performs only 1 up to all 3 'Core' functions
# People performing Functions	From 50 up to 388 (current # people)
Number of Regions	From no regions to 8 regions
Region Geographic Boundaries	Aligned with other key governmental agency boundaries
Region Headquarters Location	Varied based on geographic boundaries

Example Two-Region Alternative (Continental US Army boundaries)

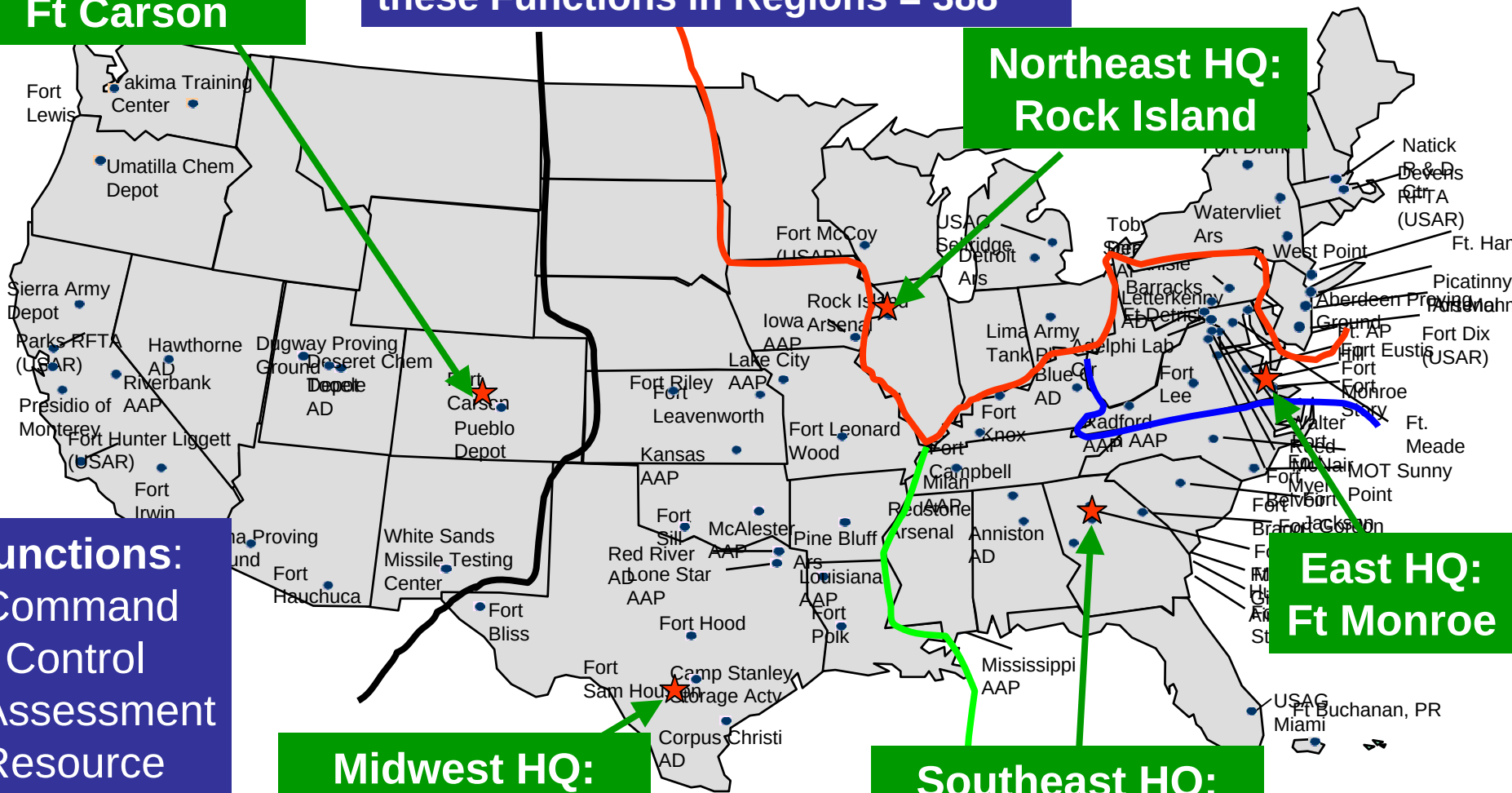


Example 5 Region Alternative (modified Corps of Engineers boundaries)

West HQ: Ft Carson

Total Number of People Performing these Functions in Regions = 388

Northeast HQ: Rock Island



Functions:
- Command & Control
- Assessment
- Resource Analysis

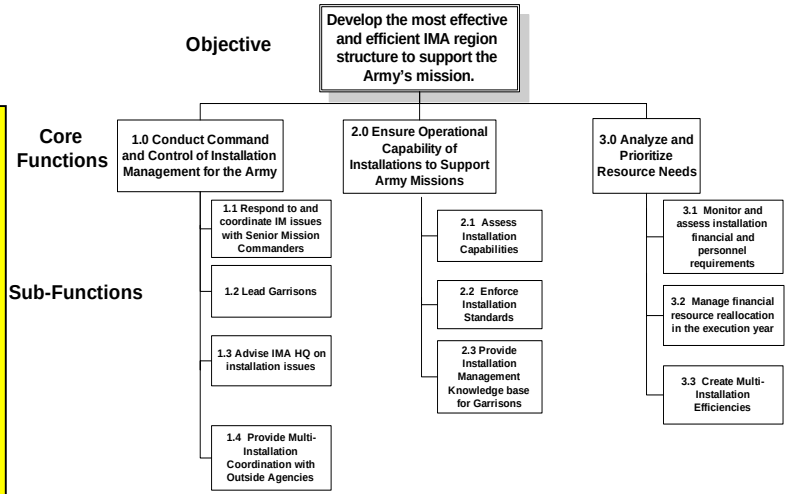
Midwest HQ: San Antonio

Southeast HQ: Ft McPherson

East HQ: Ft Monroe

Multiple Objective Decision Analysis Modeling to Evaluate Alternatives

Based on the Value Hierarchy of Core Functions for IMA Regions



Step 1:

Created objectives and evaluation measures for each key sub-function to quantify how well an alternative fulfills that sub-function.

Step 2:

Weighted evaluation measures, sub-functions and functions to capture their relative importance to the effectiveness of the regional structure.

Step 3:

Scored each alternative using Value Functions for each evaluation measure and determined an overall 'potential value-added' for how well the alternative meets the key objective.

Step 1. Objectives and Evaluation Measures for Functions

Core Function

1.0 Conduct Command and Control of Installation Management (IM) for the Army

Key Sub-functions

- **1.1 Respond to and coordinate IM issues with Senior Mission Commanders (SMCs)**
- **1.2 Lead Garrisons**
- **1.3 Advise IMA HQ on installation issues**
- **1.4 Provide Multi-Installation Coordination with Outside Agencies**

Objectives

- **1.1.1 Maximize Responsiveness to SMCs**
- **1.2.1 Maximize Capability to Lead Garrisons**
- **1.3.1 Maximize Capability to Understand & articulate installation issues to IMA HQ**
- **1.4.1 Maximize capability to coordinate IM issues with outside agencies**

Evaluation Measures

- **1.1.1.1 Weighted # General Officer HQs in Regions (lower is better)**
- **1.1.1.2 Number of different major HQs in region (lower is better)**
- **1.2.1.1 Constructed Multi-dimension span of control measure (lower is better)**
- **1.3.1.1 Number of installations in region (lower is better)**
- **1.4.1.1 Number of different major agency regions represented in region (lower is better)**

Command and Control Evaluation Measure Definitions

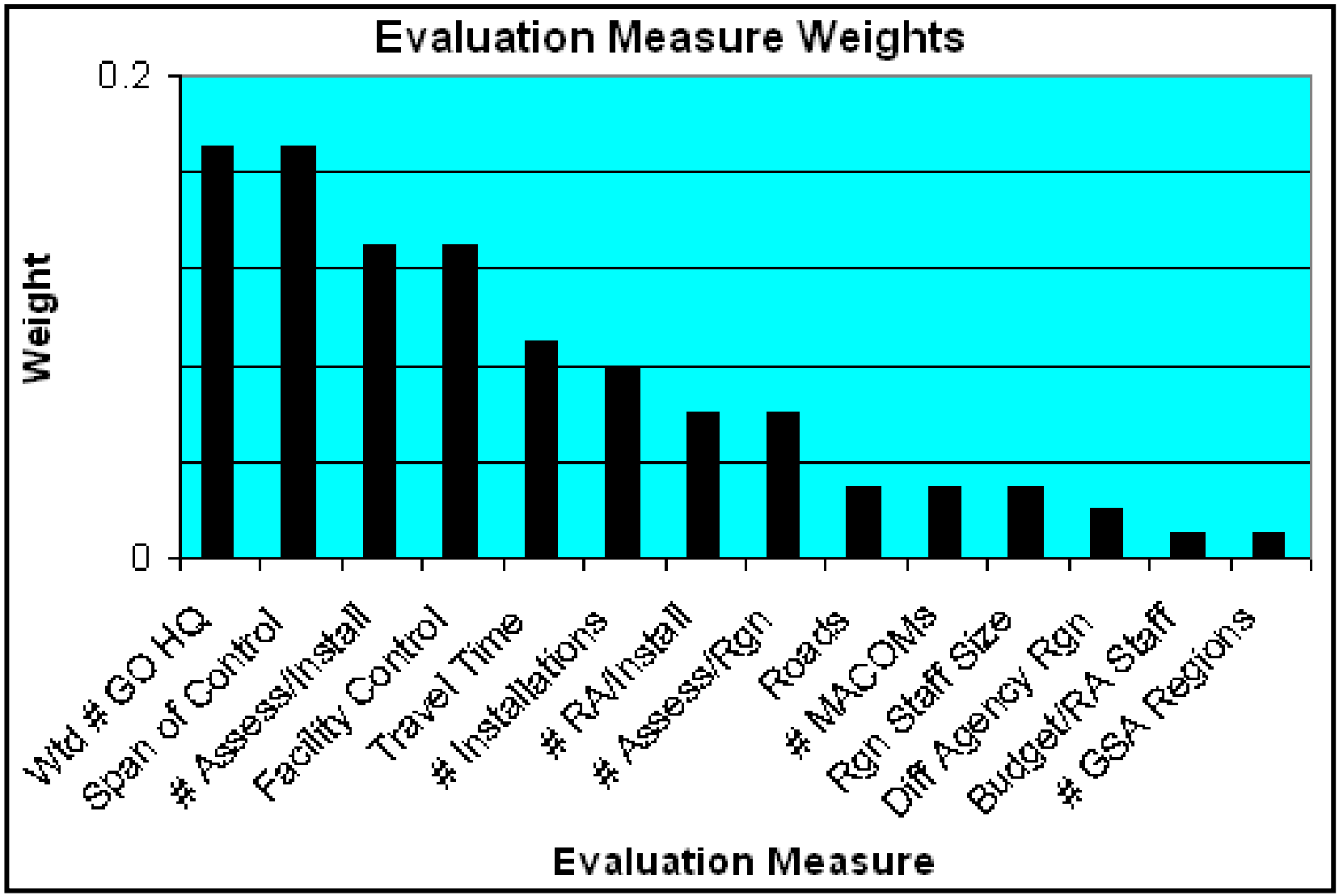
Sub-Function	Measure Name	Definition
1.1	Weighted # of General Officer HQ's in regions	Summation of the total number of 'stars' in a region, averaged across regions **(lower is better (LIB))**
1.1	# of different major HQs in region	Average number of different major HQs represented in a region **(LIB)**
1.2	Constructed multi-dimension span of control measure	Summation of 11 span of control indicators weighted by Region Director input, averaged across regions **(LIB)**
1.3	# of installations in region	Average number of installations in region **(LIB)**
1.4	# of different major agencies represented in region	Average number of distinct outside agencies in a region **(LIB)**

Step 2. Developing Weights for the 14 Evaluation Measures

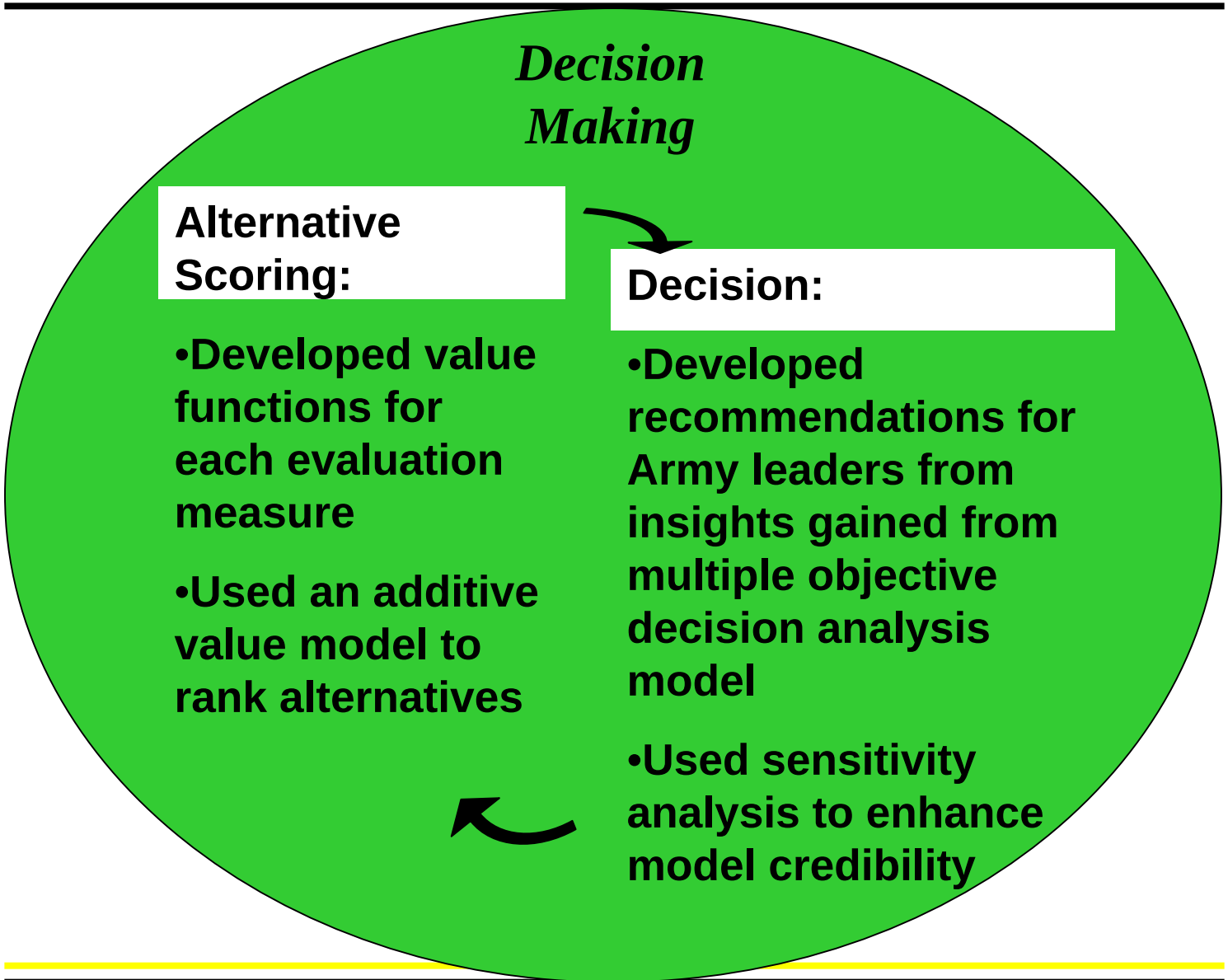
Weights: Method to represent relative importance of evaluation measures.

		Level of Importance of the Measure		
		Critical Factor	**Important Factor**	**Factor**
Variance in the Measure Scale	**High**	1. # GO HQs per region	5. Travel Time from Region HQ	11. Size of Region Staff
		2. Span of Control	6. # Installations per region	
	Medium	3. # Assessment people per installation	7. # Resource Analysts per Installation	12. # different agencies per region
		4. # Facilities per region	8. # Assessment people per Region	
			9. Area of Roadways	
	Low		10. # different major HQs per region	13. Budget $ per Resource Analyst
				14. # Gov't. Supply Agencies per region

Step 2. Resulting Evaluation Measure Weights



Evaluating Alternative Organizational Designs



Step 3. Scoring Alternatives Using Value Functions for Evaluation Measures

Value function - A function that assigns value to an evaluation measure score:

- **value functions capture returns to scale but not risk preference**
- **in this study, we converted each evaluation measure raw score to a common scale from 0 to 10.**

Additive Value Model – Used to rank alternatives when we have multiple, conflicting objectives:

- **assumes there is no uncertainty about the alternative scores**

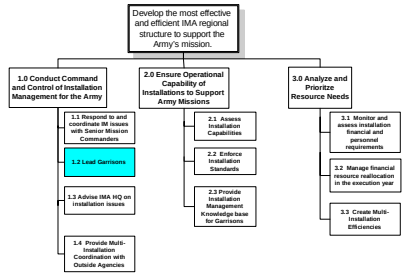
$$v(x) = \sum_{i=1}^{n} w_i v_i(x_i) \quad \text{where}$$

$v(x)$ is the overall value of alternative x

w_i is the weight of measure i

$v_i(x_i)$ is the value function score of alternative x on measure i

Value Function for the Constructed Multi-dimension Span of Control Measure



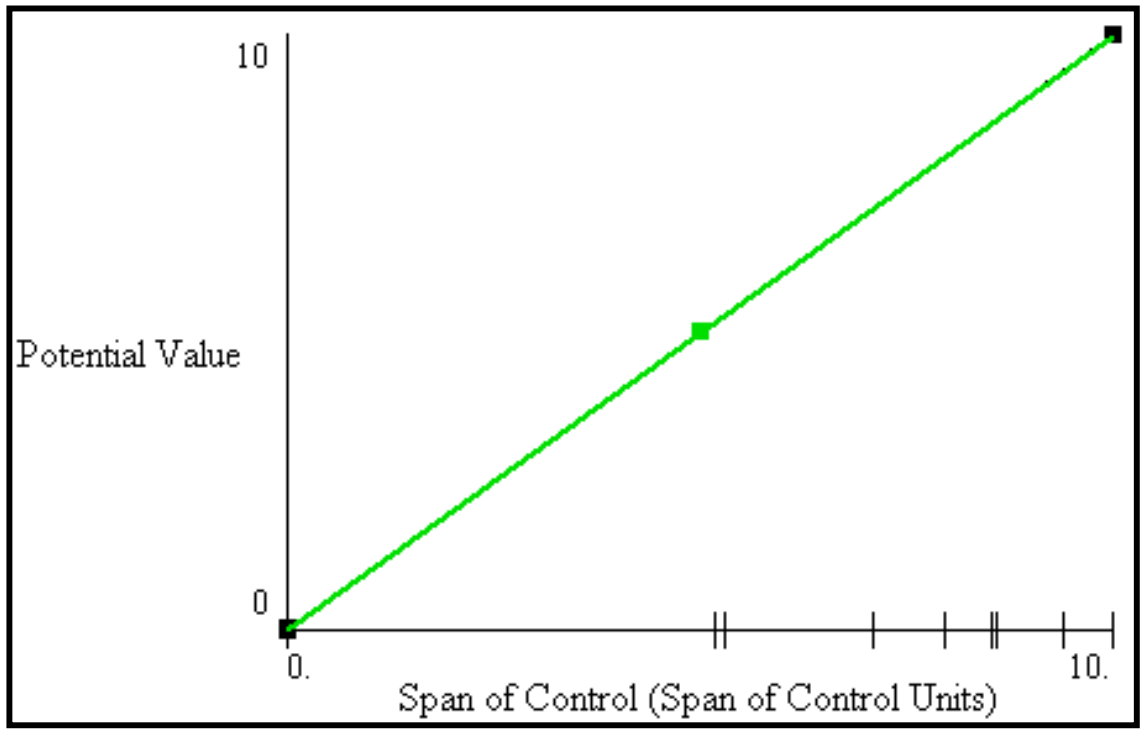
Objective: Maximize capability to lead garrisons

Definition: Summation of eleven span of control indicators (normalized to a value between 1 and 10) weighted by Region Director input, averaged over all the regions in the alternative **(higher is better)**

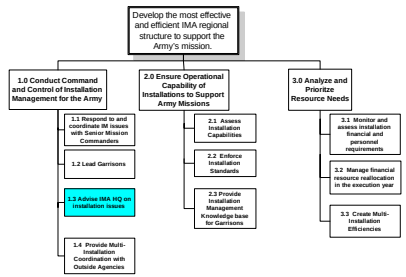
Global Weight: 0.17

Type: Direct, constructed

Value Curve: Linear



Value Function for the Number of Installations in a Region



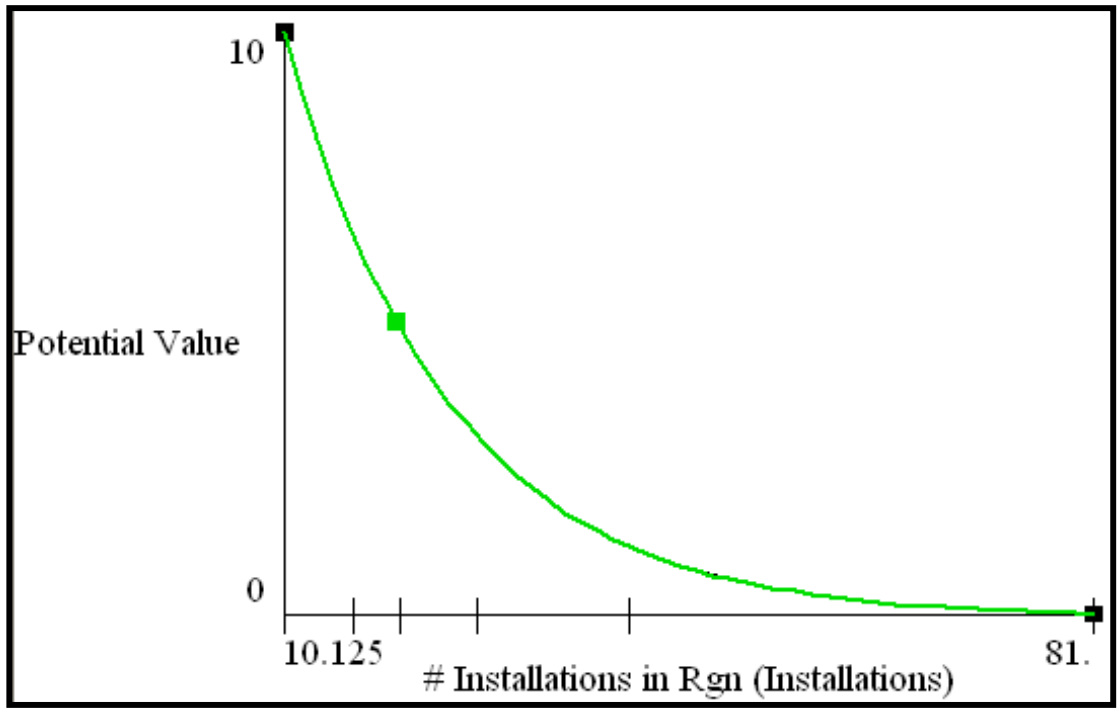
Objective: Maximize capability to understand and articulate installation issues to IMA HQ

Definition: Number of installations in region, averaged over all the regions in the alternative **(lower is better)**

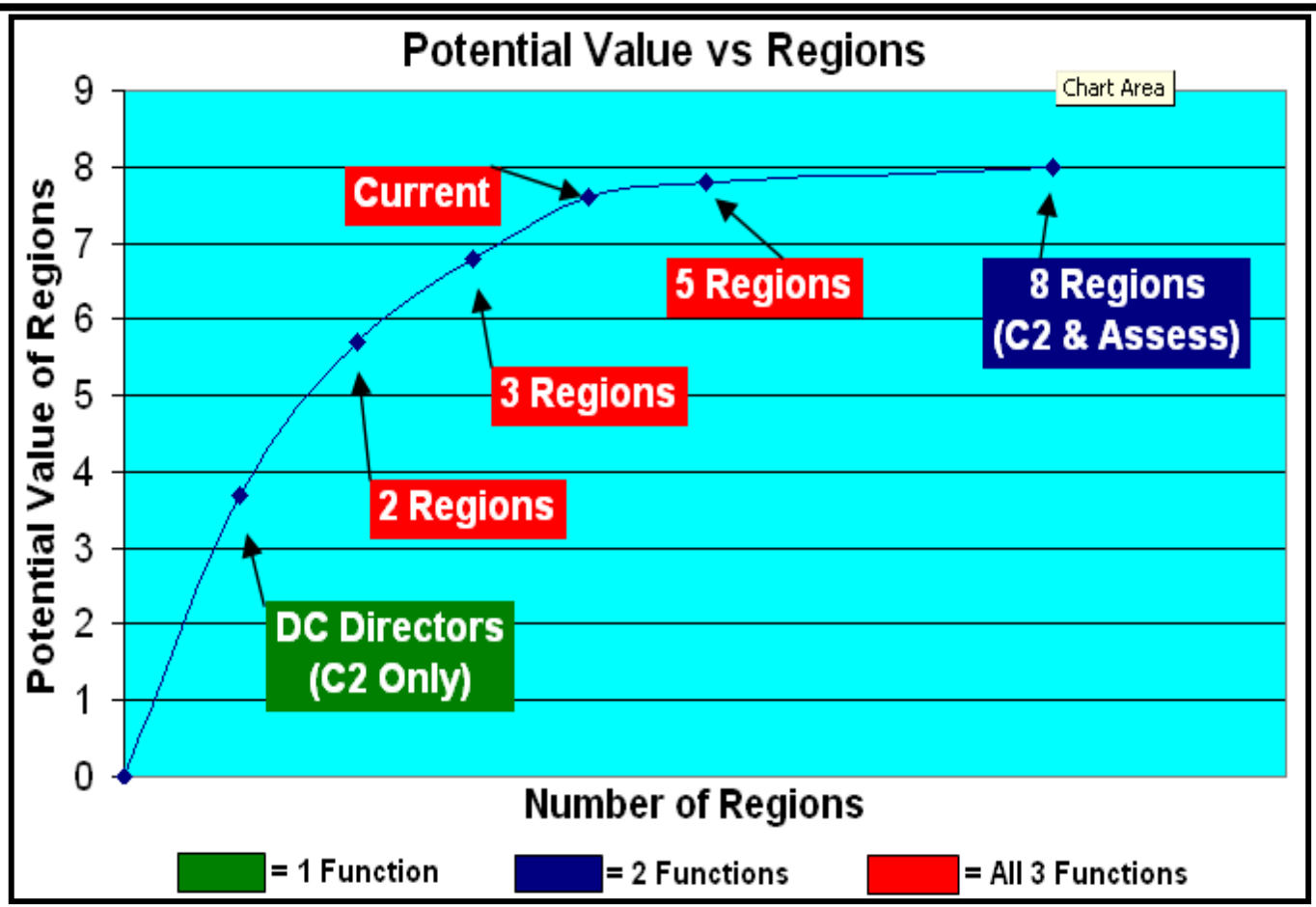
Global Weight: 0.08

Type: Proxy, natural

Value Curve: Convex (exponentially decreasing). Understanding and articulating installation issues becomes significantly more challenging as the number of installations increase; therefore, the value drops off quickly.



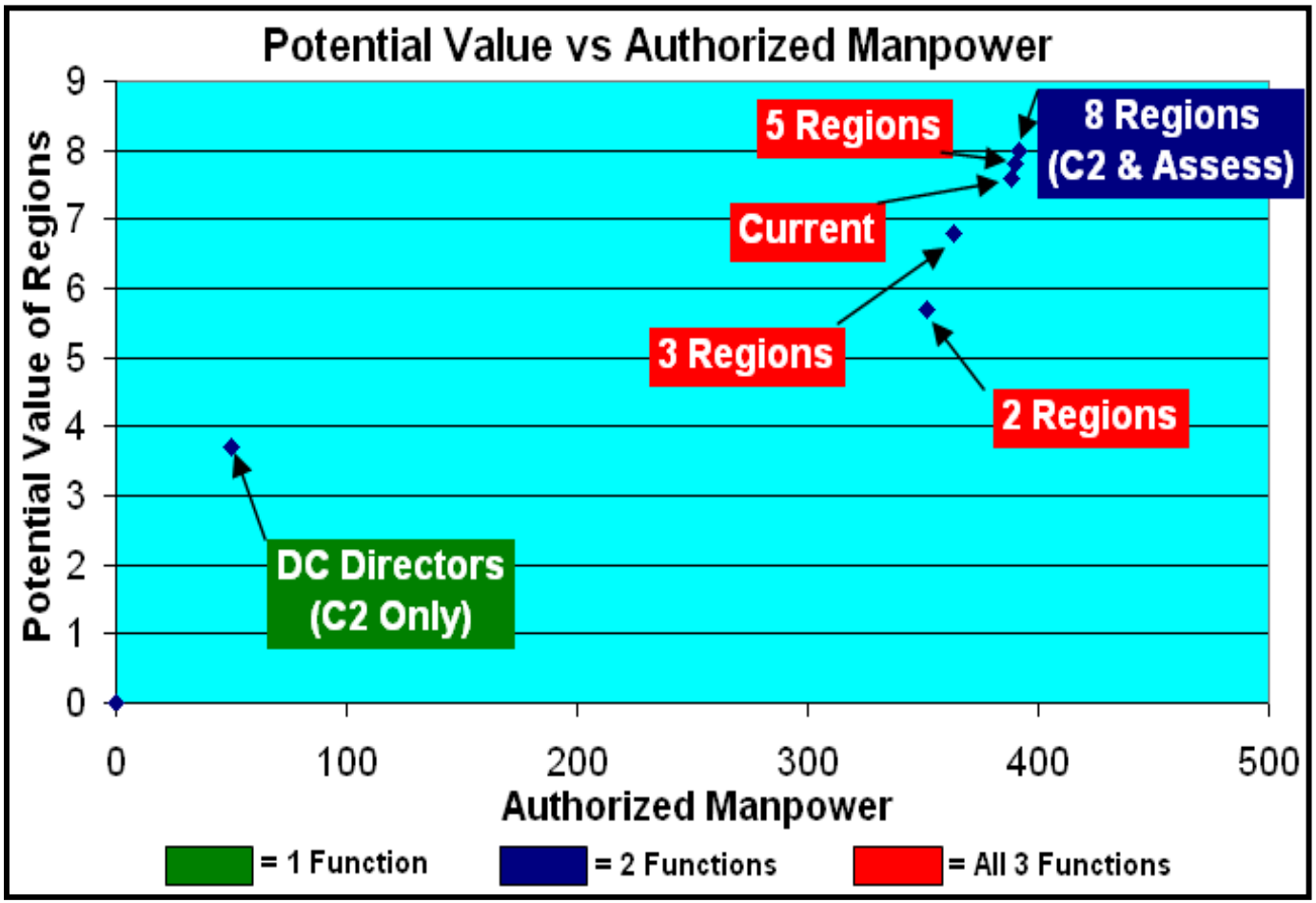
Results of Alternatives Evaluation



•Additional regions add potential value, but at a diminishing rate.

•Current structure has *significantly* greater potential value than 2 or 3 region alternatives, and *slightly* less value than 5 or 8 region alternatives.

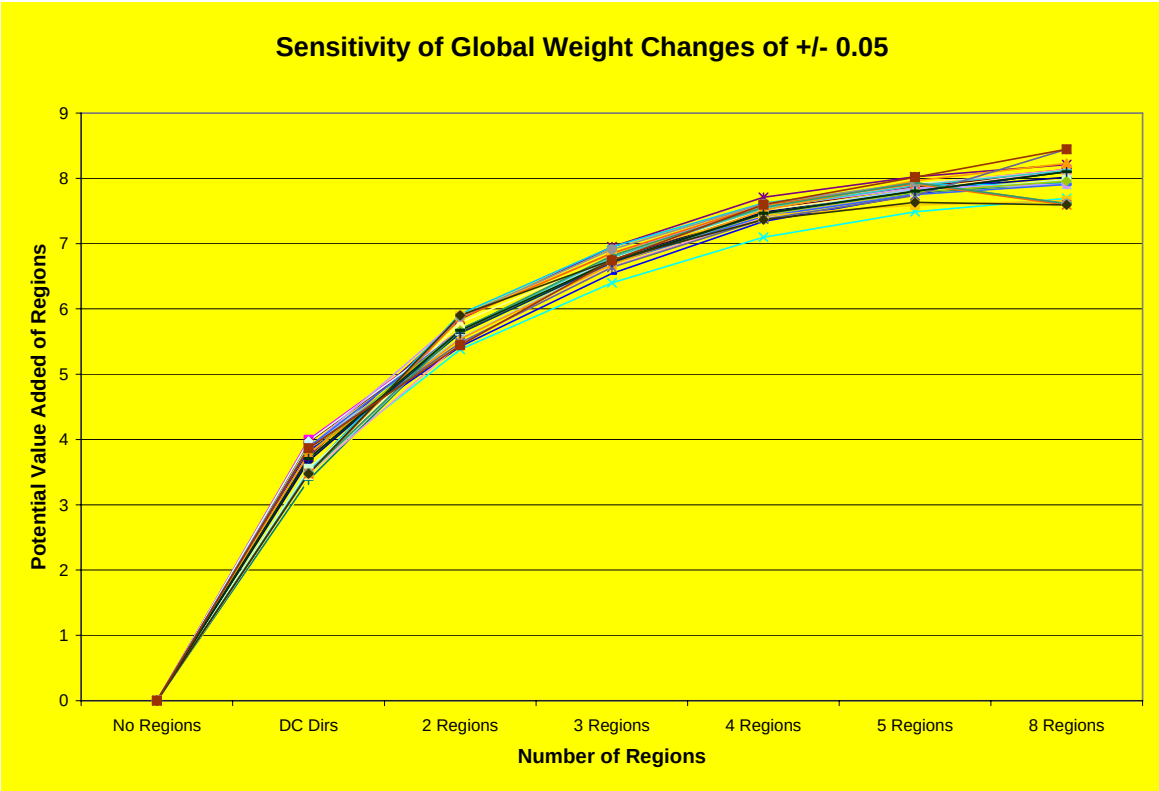
Results of Alternatives Evaluation



•Reducing the number of regions does not significantly lower manpower unless you also reduce the functions performed.

Sensitivity Analysis of Evaluation Measure Weights

- Adjusted the global weight of each evaluation measure by plus or minus 0.05 to determine if the results would be affected.



•All lines follow the general shape of the potential value added versus regions graph indicating that the shape of the results curve is not sensitive to changes in the global weights of the evaluation measures.

Study Results & Recommendations

- ***IMA is a new organization implemented in a transforming Army at war***
  - *Region Directors understand their role to support the operational units.*
  - *Regions need to develop their expertise to accomplish their mission.*

- ***Core functions of the IMA regions are command and control (C2) for installation management, ensuring installation operational capability, and analyzing installation resource needs***
  - *C2 is essential*
  - *Assessment has potential value IF region personnel build expertise*
  - *Resource analysts without dollar authority have limited impact*

Study Results & Recommendations

- ***Alternatives evaluation was based on Potential Value Added of Regions vs. Authorized Manpower***
  - *C2 alone can be done with about 50 people in DC*
  - *C2 and Assessment can be done with 30% saving in authorized manpower*
    - *Creates a 10% decrement in potential value*
  - *C2, Assessment, and Resource Analysis with 388 personnel*
    - *Potential Value of 5 regions ≈ 4 regions > 3 regions >> 2 regions*

- ***Recommendations***
  - *Retain Current 4 region structure*
  - *To achieve any needed manpower savings reduce the resource analysis function in regions*
  - *IMA needs a transparent resource allocation process that will enable better communication*

Conclusions

- The Systems Engineering and Management Process provides a good analysis framework for organizational design issues.
- Building a value hierarchy of ‘core’ functions is key to developing and evaluating good alternative organizational designs.
- Multiple objective decision analysis can be effectively used for evaluating organizational designs.